
Abstract

A38 The present invention is an implantable electronic device formed within a biocompatible hermetic package. Preferably the implantable electronic device is used for a visual prosthesis for the restoration of sight in patients with lost or degraded visual function. The package may include a hard hermetic box, a thin film hermetic coating, or both.

In the Claims:

Please delete claims 1 – 268, without prejudice.

Please add claims 269- 309 as follows:

A39 269. A visual prosthesis comprising:
an internal electronics unit, implanted within a living body, at least a portion of said internal electronics unit is formed within a biocompatible hermetic package; and
a plurality of electrodes driven by said internal electronics unit stimulating visual neurons to create a perception of a visual image.

270. The visual prosthesis according to claim 269, wherein said biocompatible hermetic package is a hermetic box.

271. The visual prosthesis according to claim 270, wherein said hermetic box includes a metal portion and a ceramic portion.

272. The visual prosthesis according to claim 271, wherein said metal portion is braised to said ceramic portion.

273. The visual prosthesis according to claim 269, further comprising a flip chip electrically connected to feed throughs in a ceramic portion.

274. The visual prosthesis according to claim 271, wherein said metal portion includes a metal ring braised to said ceramic portion and a metal lid welded to said metal ring.

275. The visual prosthesis according to claim 269, wherein said biocompatible hermetic package is a thin film.

276. The visual prosthesis according to claim 269, wherein said biocompatible hermetic package is partially a thin film and partially a hermetic box.

277. The visual prosthesis according to claim 275, wherein said thin film is a diamond coating.

278. The visual prosthesis according to claim 275, wherein said thin film is aluminum oxide.

279. The visual prosthesis according to claim 275, wherein said thin film is zirconium oxide.

280. The visual prosthesis according to claim 275, wherein said thin film is selected from the group consisting of titanium oxide, tantalum oxide and aluminum nitride.

281. The visual prosthesis according to claim 275, wherein said thin film is selected from the group consisting silicon oxide, silicon nitride, and silicon carbide.

282. The visual prosthesis according to claim 275, wherein said thin film is applied by ion-beam assisted deposition.

283. A visual prosthesis comprising:
a plurality of electrodes stimulating a retina; and
an internal electronics device controlling said plurality of electrodes and positioned within a vitreous humor, but distant from a retina.

284. The visual prosthesis according to claim 283, wherein said internal electronics device is positioned in the center of the vitreous humor.

285. The visual prosthesis according to claim 283, further comprising a thin film hermetic coating applied to said internal electronics device.

286. The visual prosthesis according to claim 285, wherein said thin film is a diamond like coating.

287. The visual prosthesis according to claim 285, wherein said thin film is aluminum oxide.

288. The visual prosthesis according to claim 285, wherein said thin film is zirconium oxide.

289. A visual prosthesis comprising:
an internal electronics unit, implanted within a living body in the vicinity of an eye, at least a portion of said internal electronics unit is formed within a biocompatible hermetic package; and
a plurality of electrodes driven by said internal electronics unit stimulating a retina to create a perception of a visual image.

290. The visual prosthesis according to claim 269, wherein said biocompatible hermetic package is a hermetic box.

291. The visual prosthesis according to claim 290, wherein said hermetic box includes a metal portion and a ceramic portion.

292. The visual prosthesis according to claim 291, wherein said metal portion is braised to said ceramic portion.

293. The visual prosthesis according to claim 289, further comprising a flip chip electrically connected to feed throughs in a ceramic portion.

294. The visual prosthesis according to claim 291, wherein said metal portion includes a metal ring braised to said ceramic portion and a metal lid welded to said metal ring.

295. The visual prosthesis according to claim 289, wherein said biocompatible hermetic package is a thin film.

296. The visual prosthesis according to claim 289, wherein said biocompatible hermetic package is partially a thin film and partially a hermetic box.

297. The visual prosthesis according to claim 295, wherein said thin film is a diamond coating.

298. The visual prosthesis according to claim 295, wherein said thin film is aluminum oxide.

299. The visual prosthesis according to claim 295, wherein said thin film is zirconium oxide.

300. The visual prosthesis according to claim 295, wherein said thin film is selected from the group consisting of titanium oxide, tantalum oxide and aluminum nitride.

301. The visual prosthesis according to claim 295, wherein said thin film is selected from the group consisting silicon oxide, silicon nitride, and silicon carbide.

302. The visual prosthesis according to claim 295, wherein said thin film is applied by ion-beam assisted deposition.

303. An implantable device comprising:
a ceramic substrate having feed throughs; and
active electronics supported by said ceramic substrate and electrically coupled to said feed throughs.

304. The implantable device according to claim 303, wherein said active electronics is an integrated circuit.

305. The implantable device according to claim 303, further comprising a hermetic package wherein said ceramic substrate forms part of said hermetic package.

306. The implantable device according to claim 303, wherein said implantable device is part of a visual prosthesis.

307. The implantable device according to claim 306, wherein said visual prosthesis is a retinal prosthesis.

308. The implantable device according to claim 303, wherein a side of said ceramic substrate opposite said active electronics is adapted to contact tissue.

309. An implantable device comprising:
a ceramic substrate having feed throughs;
a plurality of capacitors electrically coupled to said feed throughs and supported by said ceramic substrate; and
active electronics electrically coupled to said plurality of capacitors.